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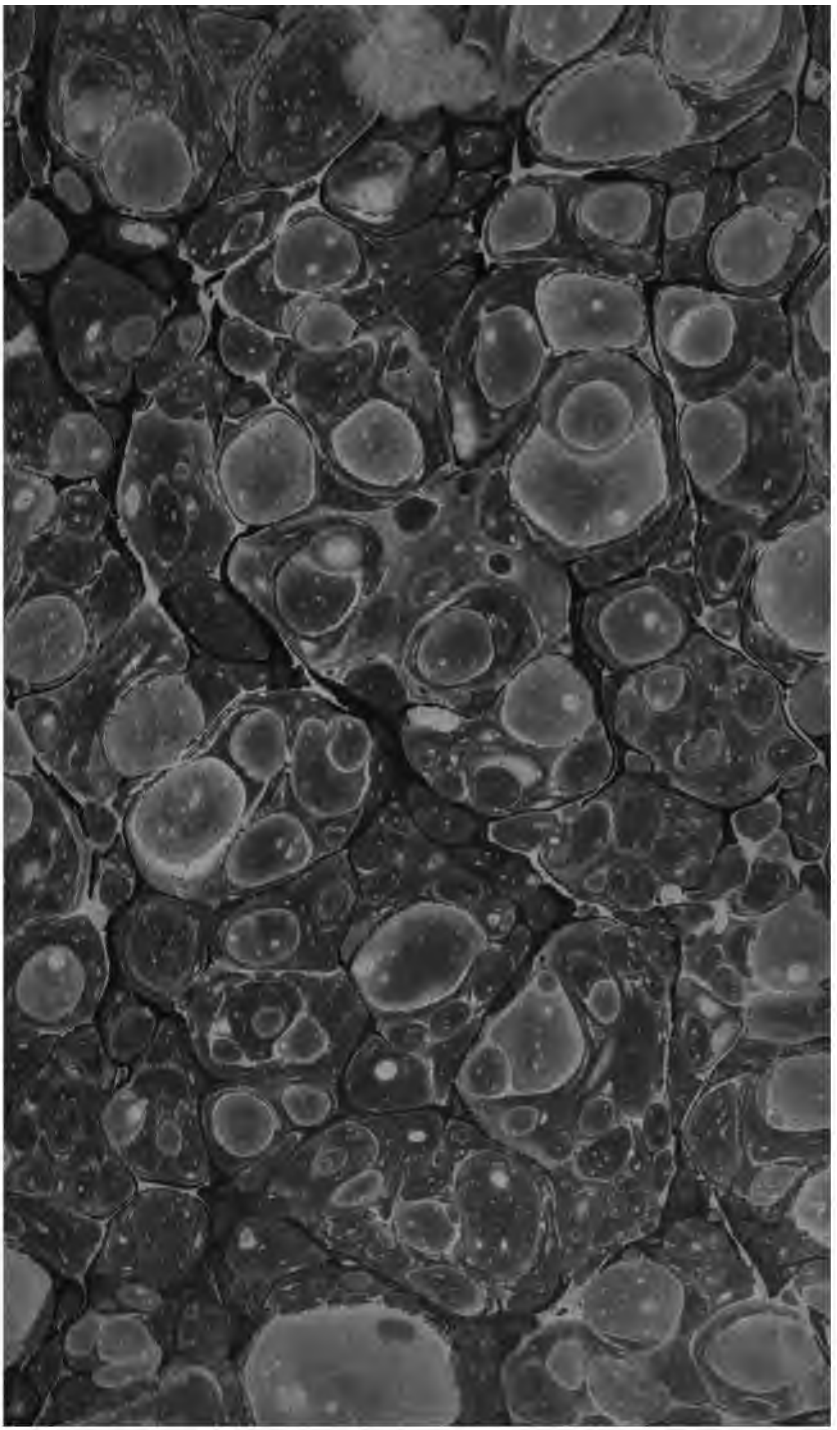

300-

WEST CUMBERLAND, FURNESS, AND MORECAMBE BAY RAILWAY.

REPORT

OF

Rare
6017/300.

JOHN M. RASTRICK, ESQ.

ON THE INTENDED

LINE OF RAILWAY

FROM

LANCASTER TO MARYPORT,

VIA FURNESS AND WHITEHAVEN.

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REPORT.

To the Provisional Committee of the West Cumberland, Furness, and Morecambe Bay Railway.

GENTLEMEN,

HAVING by appointment met Sir H. Le Fleming Senhouse, Edward Stanley, Esq. M. P., and other members of your committee at Maryport, on the 18th of October last, and having had laid before me all the information that had been obtained relative to the proposed railway,

I commenced my examination of the country at Maryport, being accompanied by Sir H. Le Fleming Senhouse.

I fixed upon the point for the junction of this intended railway with the Carlisle and Maryport railway (now in course of execution), opposite the south-east side of the Castle hill; from this point the line will bear away to the southward, passing to the east side of a new coal pit now sinking, and continuing in a direct line between the turnpike road and the sea shore on to Workington, diverting the turnpike road in one or two places, to give more room, and to obtain a straighter line for the railway.

At Workington I was also joined by Mr. Mitchell, of Maryport, who went over the ground with us to Whitehaven, and his assistance, from his knowledge of the country, was very serviceable to me. At Workington, the railway will be carried over the Derwent, at such a distance above the quays as not to interfere with the shipping. The line will then be continued in a direct line, making towards the sea shore, and passing close to Westfield, and then passing between the rope-walk and the high hill on the east of the rope-walk, passing on the east end of Harrington harbour, and continuing with an easy curve direct to the cliffs at the chemical works, and so on along the cliffs to Parton, passing, along the shore to Lord Lonsdale's railway, under which it will pass, and by tunnelling through the hill, the line will come out between Brocklebank's ropery and Bransty old road.

The railway will be carried through the town of Whitehaven on arches at such a height above all the streets, as to present no obstacle to the free and commodious communication between the town and the harbour.

The direction of the railway through the town of Whitehaven will be on the north-west side of Tangier-street, on the north-west side and parallel to Strand-street, occupying the full length of this street. It will then pass through Gale-lane by the Market-place to Gale-court, through Ribton-lane, and on through Messrs. Barkers' soap works, in front of Castle-row, and direct to the Brown Ware pottery, near which it will pass over the lower road to St. Bees.

From this point, the line continues to Green Bank, round by Woodside, into the St. Bees valley, passing St. Bees on the west side, and then it continues all along the cliffs by Wabrow Nook, to the river Calder.

At Green Bank, I laid down and examined other lines for levelling at Whitehaven, and from thence to the river Calder I was accompanied by Mr. Harrison, Mr. Barker, and Mr. Mitchell, whose knowledge of the localities was of the greatest possible advantage to me.

The line I laid down for the Egremont deviation, went direct from Green Bank to the valley on the road from Whitehaven to Egremont at Bigrigg, passing into the valley of the river Ehen, a little to the south of Cleator, and continuing down the valley, and passing on the east side of Egremont, by Low Mill, Woda Bank, Ehenside, and by St. Bridget's, to join the main line near the river Calder.

I laid down another line diverging out of the main line a little to the north of St. Bees, passing on the east side of that town, and continuing on the east side of the road from St. Bees to Nethertown, but crossing the said road about half a mile to the north of Nethertown, which it passes on the west side thereof, and continuing on southward to Braystones farm, to join the Egremont diversion near the river Ehen, along which it goes to join the main line near the river Calder.

The main line passes over the river Calder, near its mouth, and continues at a short distance from the shore to Whitriggs, passing nearly in a direct line to Townend, on the west of Drigg.

Mr. Harrison, Mr. Barker, and Mr. Mitchell having left me, I was invited to take up my quarters at Sir Le Fleming Senhouse's at Seascale-hall, and I was highly gratified in being favoured with his company and able assistance in examining the remainder of the country all the way to Lancaster.

From Townend, near Drigg, the line will curve round to the south-eastward, passing the turnpike road to Ravenglass, near Mite-house; it will then pass over the river Mite, and pass behind or on the eastern side of Ravenglass, and continue in nearly a southern direction, and cross the road from Ravenglass, from Bootle near to Beeby Gate, and curving round to Holm Yate, following up the valley to Whitbeck, which is the summit; from hence it will continue down another valley by Site Croft, Kirk Santon, Whitrigg Close, and to Hodbarrow Point.

I laid down another line for levelling, to go nearer to Bootle; it leaves the main line near to Beeby Gate, and passes close to the western side of Bootle, running parallel to and at a short distance on the western side of the road from Bootle to Whitbeck, near which latter place it joins the main line.

Having examined the country down to Hodbarrow Point, we made the best of our way to Broughton, and next day we proceeded to Furness Abbey, and having met Mr. Jopling, we were favoured with his assistance in examining the country in the neighbourhood of Furness Abbey.

From Hodbarrow the line continues directly across the Duddon to Ronhead; it then curves round by West Plat, leaving Furness Abbey on the south, but passing completely out of sight of it, the line here being in deep cutting through the red sand stone rock, continuing by an easy curve on the south side of the Hole Beck, to Leonard's Point, near Newbiggin, on the west side of Morecambe Bay, where it joins the line laid down by Mr. Hague, that runs across Morecambe Bay to Poulton, on the eastern side thereof.

I laid down several lines here for levelling, the country presenting such variety of surface.

The first was a deviation starting out of the main line near Little Mill, and joining the line laid down by Mr. Hague, which joins the Duddon, about one quarter of a mile to the north of Ronhead.

The second was a deviation at Holebeck passing nearer Leece, in order to diminish the radius of the curve of the line.

I had also the line laid down by Mr. Hague, which I ordered to be levelled from Newbiggin by way of Newton and St. Helen's to the Duddon, at the point from whence Mr. Hague had his section taken across to Hodbarrow Point.

From all these different sections it was afterwards found that the point fixed upon by Mr. Hague on the east side of the Duddon did not work into the line which I found it necessary to fix upon to carry the line across the promontory of Furness, so advantageously as the line from Ronhead to Hodbarrow point. It therefore became necessary to level the line across the Duddon from Ronhead to Hodbarrow point, and I found it does not materially differ from the line a little above it, as levelled across by Mr. Hague, and therefore his project will not be influenced by this small deviation from his line across the Duddon.

Having therefore carefully examined the promontory of Furness and the western coast of Morecambe Bay from Newbiggin up to Ulverston, we proceded to Poulton, on the eastern side of Morecambe Bay and examined the country very carefully from thence to Lancaster.

The main line passes from Poulton to the north of Torrisholme, on the north of Skerton, and passes over the river Lune above the bridge at Lancaster, and passing over the Lancaster Canal near Bridge Lane, it then curves round and joins the Lancaster and Preston Railway near to the station of that Railway at Lancaster.

I had the line laid down by Mr. Hague from the Lancaster and Preston Railway also levelled: this line passes over the river Lune below Lancaster bridge, passes through more valuable property at Lancaster, has a quicker curve and a more expensive passing over the Lune.

At Lancaster we were assisted in our examination of the district by Mr. Jackson, Vice-Chairman of the Lancaster and Preston Railway Company, to whose polite attention we are much obliged.

At Lancaster I parted with Sir H. Le Fleming Senhouse.

I have been thus particular in detailing the examination which I made of the country through which this railway is proposed to pass, that you may be assured that every pains was taken by me to obtain a thorough knowledge of the country and all its localities, so as to give my staff on my return to London my instructions with almost as much advantage as if I had been on the spot with them.

Indeed I walked over the principal part of the line, having spent a

whole week upon it, and I must here beg leave to return my most sincere thanks to all the gentlemen who were kind enough to afford me their assistance, and particularly to Sir H. Le Fleming Senhouse for the pains he took to obtain for me the information I was in quest of.

On my return to town, I sent down my staff, and they having levelled all the various lines already described and returned to town again, I have now to present you with the result of their labours, and my observations in general terms upon the whole of the line.

Accompanying this report I have sent you a section plotted to a longitudinary scale of five inches to a mile, and a vertical scale of eighty feet to an inch; over this section are also plotted all the different deviation sections that have been levelled, in order that my reasons for preferring the one which I have laid down for the main line may be seen at once by inspection, as they are placed immediately above that part of the section of the main line that has been adopted in their places.

I have also sent you half a dozen Maps of the whole line of country, all the way from Lancaster to Maryport, with the Main Line, and all the variations that I have had levelled laid down upon it to a scale of one inch to a mile.

I have also sent half a dozen Sections of the Main Line to accompany these Maps upon the same longitudinary scale, and to a vertical scale of four hundred feet to one inch; but it was not thought necessary upon this small scale to lay down the sections of the different variations that are plotted with the large sections.

I shall now travel back again over the line from Lancaster to Maryport, and make a few observations as I go along.

The Lancaster and Preston railway has so high a terminus at Lancaster above the river, and the grounds are so low on the north side of the river, and the distance in which it is necessary to come down to low ground in order to run on to the Morecambe Bay embankment being so short, I have been obliged to adopt a steeper gradient here than I otherwise would have wished, the inclination being twenty-four feet per mile, or one in two hundred and twenty for three miles and fifty-three chains.

I do not, however, otherwise regret being obliged to adopt the gradient than as it does not so well comport with the more favourable gradients on the rest of the line.

That there can be no practicable objection to this gradient for this short distance can be best answered, and will come home to the conviction of every one when they are informed, that there is on the Grand Junction railway a gradient of twenty-nine feet three inches per mile, or one in one hundred and eighty for three miles and twenty chains, which is worked over daily without one passenger in a hundred being aware of the fact.

On comparing the section below the bridge at Lancaster with the section above the bridge which I have adopted, it will be seen that there is less cutting, less embanking, less bridging, and the radius of the curve is more than double, and that therefore it is the preferable line in all respects.

As it is not my intention to enter upon the subject of the passing over Morecambe Bay and the Duddon Sands, that having been sufficiently reported to you upon by Mr. Hague, I shall only here observe that I

have included them in my plans and sections, that you might have a continuous line from Lancaster to Maryport all in one section.

The railway will pass over the Morecambe Bay on a level, and in entering Furness near Newbiggin the gradient becomes sixteen feet per mile, or one in three hundred and thirty for four miles to the summit, and then it falls at the same rate for four miles to the Duddon Sands.

I have given you here the sections of all the different lines that I have had levelled. I have of course given the preference to the one I have adopted for the main line, which is entirely through the red sand stone formation, and consequently the sides of the cuttings can be cut upright, and the material that will be got will be serviceable for the masonry on the line; the upper section would for a considerable portion of its distance pass through the limestone formation. It is, however, quite out of the question to make a railway on that line, as it would require two miles of tunnelling, and although Mr. Hague will require a large quantity of material for his Morecambe Bay embankment, it is much more preferable to make the railway in a situation where it will be less below the surface of the ground, and to get the material for the embankment by side cutting nearer at hand.

It will be observed that I have laid down a branch up to Dalton that is not one mile in length, and which can be made at a comparatively small expense.

I have not thought it necessary to survey or level a line up to the important town of Ulverston, as the railway up to that town will be laid down on the embankment which Mr. Hague proposes to make for the ship canal, and will consequently be a perfect level line, except where the diversion from the embankment goes off to rise up to the town. It will be necessary to have this branch laid down in the parliamentary plans, and inserted in the notices.

The railway on this embankment will be a valuable auxiliary to the ship canal, as the vessels can be towed up or down the canal by the locomotive engines expeditiously, and at a light expense.

I have found it necessary to make an addition to the embankment over the Duddon Sands as proposed by Mr. Hague, in order to preserve a gradient of sixteen feet per mile; but for this we have abundance of material from the cuttings that could not otherwise be disposed of.

It will be seen from the section that there is no work of any magnitude from Hodbarrow Point to Bootle, and that the line that I had levelled to take the railway nearer to Bootle, cannot be put in competition with the line I have adopted, which leaves Bootle about half a mile to the eastward, and which I am given to understand, is preferred by the inhabitants.

From hence to Ravenglass the line consists of alternate cuttings and embankments; at Ravenglass the rivers will be passed over on arches.

From Ravenglass to St. Bees the cuttings and embankments are comparatively light, and as the line will be carried along the cliffs through the red sand stone formation it will be of easy execution.

It being suggested to me that a line further inland would be more desirable than the cliff line, I had the deviation (called the St. Bees deviation on the section) levelled in order to shew the disadvantage of taking that course; for although it was quite apparent to me when on the spot that I could not find a line of such a character as would induce me to adopt

it, yet to unexperienced eyes it must appear to be a good railway line, and a question might hereafter arise, and enquiry might be made, why I had not taken it.

It will be seen that on the cliff line, there is no inclination more than ten feet per mile on one side of the summit, and eight feet per mile on the other side of the summit, whereas upon the inland line there is thirty feet per mile on one side of the summit for three miles and a half, and thirty feet per mile on the other side of the summit for three miles, and the expense of the construction of the line would be three times as much.

As the length of the line of railway if taken up the valley to Egremont, and by way of Cleator to Whitehaven, would have been something shorter than the line round by St. Bees, and as that valley was full of population, and contained very valuable mines of iron ore, it would have added very much to the utility of the railway, provided the country would have admitted of a line of railway being constructed through it with such gradients as would have been admissable on a main line, and provided the works to be executed to obtain these gradients were not of too expensive a description.

I carefully examined the whole of this district, and although I was quite satisfied myself from my view of the country that there was no chance of getting such a line as would justify me in making it part of the main line, yet in order to convince those who might not be able to form an opinion without seeing a section of each line on paper, I gave orders to have the levels taken, and the section called the Egremont deviation is the result of these levels.

It will be seen that this deviation is infinitely worse than the St. Bees deviation, for here we have three miles and one half with a rise of forty-four feet per mile to the summit, then a level for two miles, and then a descent for three miles of forty-four feet per mile; the works are of a very expensive description, and in addition to these disadvantages, we should be obliged to have a tunnel of one mile and three furlongs long, and that on the steep incline of forty-four feet per mile. Therefore, to take the main line round in this direction would be quite out of the question.

If when the act for the main line is obtained, the traffic out of the valley of Egremont should be considered to be entitled to a branch, it should go out of the main line near Wabrow Nook, and although it would be considerably round to go this way to Whitehaven, it would afford a good communication southward.

It will be seen from the section that from St. Bees to Whitehaven there is only one cutting of any importance, and by a slight deviation of the line, this may be reduced to such an extent as just to produce as much cutting as would be required by the embankments.

I have already stated that the railway would be carried through the town of Whitehaven on arches, and as there is such abundance of fine stone in the immediate neighbourhood, these arches might be constructed in such a way as to be highly ornamental to the town.

The tunnel which would have to be made through the hill on the north of the town all you gentlemen of Whitehaven know better than I can tell you that it is a most perfect and valuable sand stone, and that the tunnel would be cut out of it in the solid, and that except in some few places where the strata might be dislocated, no arching or building up would be

necessary, and that all the stone that was got out in making the tunnel would be used in constructing the arching through the town of Whitehaven.

From the north end of the tunnel, where the railway passes under Lord Lonsdale's railway to Harrington, there are no works of any magnitude, and in the cliffs there is plenty of stone close at hand for all the purposes of the works on the line.

At Harrington there would be a series of arches, to carry the railway across the eastern end of the harbour.

From Harrington to Workington the works would be of a very easy description, being cutting through sand hills and embankments of sand.

There would be a series of arches to carry the railway over the river Derwent at Workington; from hence to Maryport the railway would run nearly upon the surface.

In looking over the section, it will be seen that from Maryport to Hodbarrow Point, a distance of forty-two miles and a half, there is no gradient of more than twelve feet per mile, that the next steepest gradient is sixteen feet per mile across the promontory of Furness, and that the steepest gradient upon the whole of the line is twenty-four feet per mile, and this fortunately occurs at that part of the line where it can best be admitted, thus affording to the trains a good velocity at starting out of Lancaster, and enabling them to bring up at the station with greater ease.

The following is a list of the gradients upon the whole line, commencing at Maryport and travelling south to Lancaster:—

Table of Distances and Gradients.

Total distance.	Intermed. dist.	Rises.	Falls.	Gradients.	Ratio.
Miles. Chains	Miles. Chains.			Ft. per mile.	
5.40	5.40	Level.			
7.60	2.20	Rise.		8·	1-660
9.00	1.20		Fall.	12·	1-440
11.00	2.00	Level.			
12.00	1.00	Rise.		12·	1-440
15 00	3.00	Level.			
16.40	1.40		Fall.	6·	1-880
19.00	2.40	Rise.		8·	1-660
21.40	2.40		Fall.	10·	1-528
22.00	0.40		Fall.	6·	1-880
25.00	3.00	Rise.		10·	1-528
27.00	2.00		Fall.	10·	1-528
28.00	1.00		Fall.	8·	1-660
30.00	2.00	Level.			
30.40	0.40	Rise.		8·	1-660
32.40	2.00	Rise.		12·	1-440
33.40	1.00	Rise.		8·	1-660
34.40	1.00		Fall.	8·	1-660
35.40	1.00	Level.			
36.60	1.20	Rise.		8·	1-660
40.00	3.20		Fall.	8·	1-660
41.40	1.40	Level.			
43.00	1.40		Fall.	8·	1-660
43.40	0.40	Level.			
47.40	4.00	Rise.		16·	1-330
51.40	4.00		Fall.	16·	1-330
63.166-10	11.566-10	Level.			
66.696-10	3.53	Rise.		24·	1-220

In this table you have the gradients consecutively; the following table *will shew at one view* the total length of each particular gradient—viz.:—

GRADIENTS.			DISTANCES. MILES.		CHAINS.
Level			27	"	16½
6 feet per mile,		or one in 880	2	"	00
8 feet	ditto.	or one in 660	14	"	20
10 feet	ditto.	or one in 528	7	"	40
12 feet	ditto.	or one in 440	4	"	20
16 feet	ditto.	or one in 330	8	"	00
24 feet	ditto.	or one in 220	3	"	53
		Total	66	"	69½

I have gone carefully through the sections, and have had all the cuttings and embankments carefully calculated, and I find the earthwork will not exceed 70,000 cubic yards per mile, on an average. Leaving, of course, the Morecambe Bay and Duddon Sands out of the calculation, I believe there are few railways in the kingdom which have an average of so small a quantity of earthwork per mile.

I have gone through a calculation of the probable amount of the cost of this railway, and from the favourable nature of the materials in the cuttings and embankings, and considering that stone for the bridges and other works on the line can be had in any quantity at almost every point where it would be wanted, and that the land which would be required for the railway being principally among the cliffs, would, on an average, including the more valuable land at a greater distance from the shore, not be of an expensive description; and that in consequence of the line running so close to the sea shore, comparatively few occupation bridges would be required.

I am of opinion that this railway may be safely estimated at fifteen thousand pounds per mile; but to include all contingencies, it will be more advisable to estimate it at sixteen thousand pounds per mile.

Taking the length of the railway, exclusive of the Duddon Sands and Morecambe Bay, at fifty-four and a half miles, the capital of the company for this part of the undertaking would have to be £872,000; and for a line of railway from Newbiggin up to Ulverston, a distance of eight miles, which would only require a single line of rails to be laid down upon the embankment of the river, but including the land from the river to Ulverston, with stations, sidings, &c., &c., the cost would be about £28,000 more, making a total capital of £900,000 for this part of the project.

From the general character of the work, and facility of obtaining materials all along the line, I am of opinion that if the work is set about with spirit, and the money called in as fast as it is wanted, that the line of railway may be opened out to the public from end to end in about two years.

I do not pretend to say that the embankment across Morecambe Bay can be completed in that time, but that a good, safe, and substantial road for the engines and trains to travel upon, constructed with timber in the way proposed by Mr. Hague, can be made in that time I have no doubt; this being once effected the construction of the embankment, and the other works connected therewith, can be carried on with the greatest care and safety.

I, however, think the completion of the embankment across Morecambe Bay will require rather more time than Mr. Hague has allotted it. I should prefer to push on the works of the railway, and get the traffic

upon it, and follow up the construction of the embankment more leisurely, and for that reason I would assign to the Morecambe Bay embankment five years for its completion, although I believe the embankment may be made sufficiently secure to shut out the sea from the Bay in three years and a half, the time proposed for its accomplishment by Mr. Hague. The embankment across the Duddon, I would engage should be completed by the opening of the railway.

I consider it quite unnecessary to draw comparisons with other projects for making railway communications from Lancaster to Carlisle, as this line of railway has sufficient merits of its own to stand upon independent grounds, and does not require to be bolstered up by deprecating other schemes.

One thing I think must be quite apparent, that the hostility that has been shown to this line by the promoters of the other projects, is a demonstrative proof of the superiority of it, and their apprehension that it will ultimately be carried; for if our line was so visionary and hopeless they need not have troubled themselves to depreciate it.

I am quite willing to submit this project to the ordeal of the public opinion, and I have no fear that it will receive such support from the public as will enable us to carry it successfully and triumphantly through Parliament.

This line of railway, considering its length, is of as easy execution, and as cheap a line as any that have come under my notice, and I beg you to bear in mind that this observation is not made as the result of a mere flying visit through the country, but of a mature and well digested investigation upon the spot of every part of the line, and from sections taken with as much care and precision as they could have been taken for the parliamentary plans.

It will now become necessary to proceed with the surveys, plans, and sections for depositing with the Clerks of the Peace on or before the first of March, and as the surveys will be extensive, there is not a moment to be lost in having them begun upon, for it must be borne in mind that if the plans are not deposited on or before the first of March next, a whole year will be lost in the obtaining of an act of parliament.

It now becomes absolutely necessary that every one interested in the prosperity of West Cumberland should exert themselves in setting manfully to work to forward this project, for if there should be any delay or hesitation in the business, it is more than probable that some other line, however inferior to this one, will be taken up by the public. A line from Lancaster to Carlisle is very much desired, and I may say absolutely necessary to be made to complete the link now wanted between the South of England and the West of Scotland, and if you do not bring forward this line of railway, and support it with all your might, West Cumberland will for ever after remain in the back settlements.

I have only one more observation to make, and that is, as the gradients are so very favourable upon this line, it will be worked as cheaply as any railway in the kingdom.

I am, Gentlemen,
Your most obedient Servant,
JOHN M. RASTRICK.

London, 454, Charing Cross, East,
Dec. 24th, 1838.

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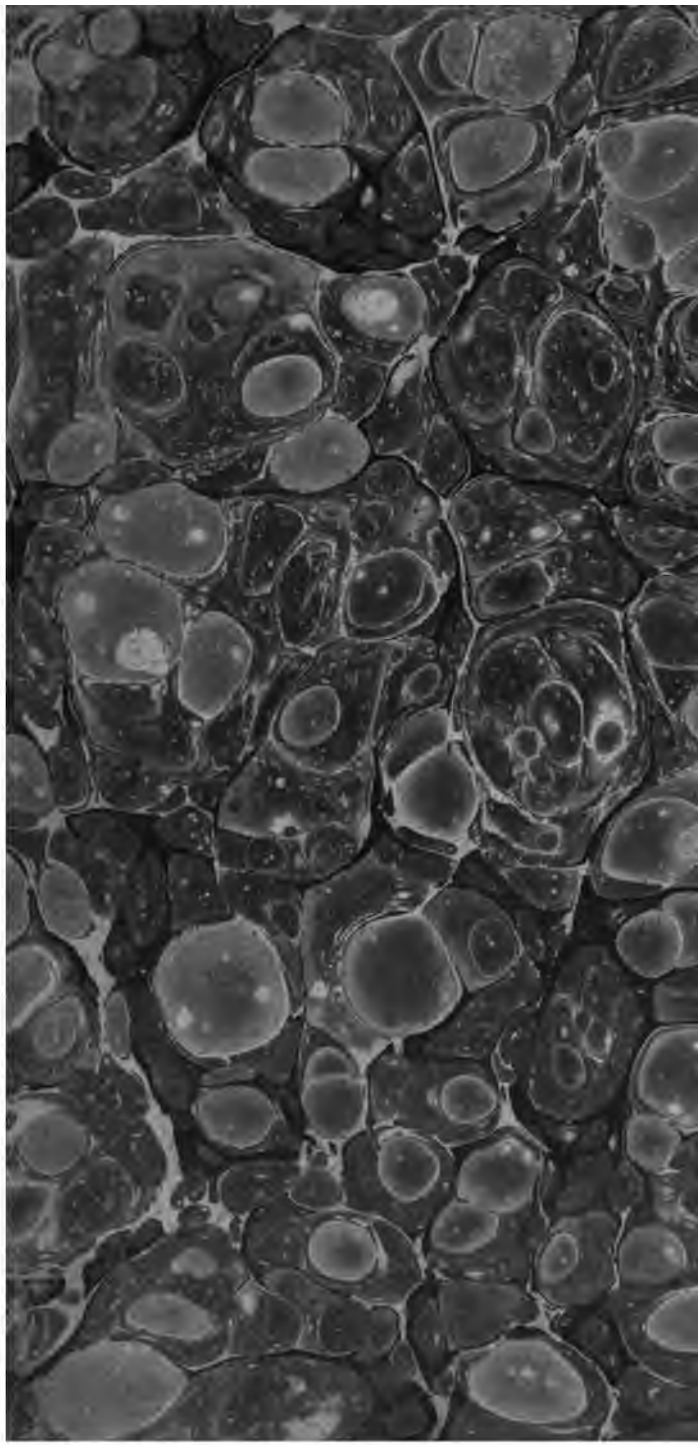

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